

# PATENT ABSTRACTS OF JAPAN

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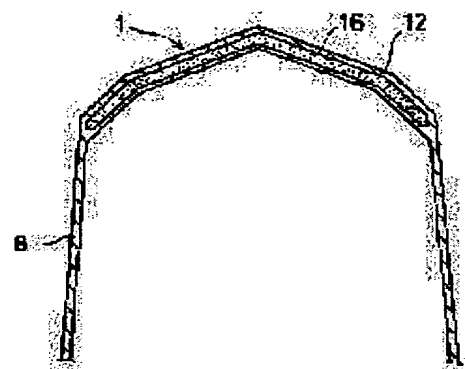
(72)Inventor : OKADA KYO

## (54) OUTDOOR BUILDING

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To contrive to enhance heat retaining properties and durability as well by forming the top board of an outdoor building with a multi-layer board having a hard expandable layer.

**SOLUTION:** The top board 1 of an outdoor building is formed in a multi-layer while the inner layer is shaped up with a hard polyurethane foam-made expandable layer 16. The expandable layer 16 is integrated into the wall thickness of the top board 1. This construction makes it possible for the top board to withstand snow load to a satisfactory extent and shut down the temperature of open air by a thermal insulating action of the hard urethane foam.



## LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] The outdoor building characterized by constituting the top plate of the top-plate section of said outdoor building with the multilayer board which has a hard foaming layer in the outdoor building used when arranging the device for observation or the devices for measurement, such as the weather or a seismic observation, etc. in the outdoors.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the structure of the top-plate section of an outdoor building especially about the outdoor building used when arranging the facility equipments etc. in the outdoors at devices for observation, such as the weather or a seismic observation, or the device for measurement, and other various device lists.

[0002]

[Description of the Prior Art] the object for facilities which it equips with a deck watertight luminaire, fire-resistance, weatherability, etc. so that the original function of the device for observation or measurement may not be spoiled in arranging the device for observation or the devices for measurement, such as the weather or a seismic observation, etc. in the expected observation and a measurement location conventionally -- a transit shed -- building -- this object for facilities -- a transit shed -- it is common inside to carry out arrangement hold of said device.

[0003] therefore, an artificer -- objects for facilities, such as said device, -- the object for facilities which is rich in the simplicity of construction, and an economical efficiency list at appearance nature while it is rich in the endurance which can demonstrate the suitable expected operation effectiveness as a transit shed -- the object for severe earthquake observation facilities which repeats research to development of a transit shed and is shown in drawing 14 -- it just succeeded in operation of a transit shed

[0004] a deer -- carrying out -- the object for the severe earthquake observation facilities of this illustration -- a transit shed 50 -- a transit shed -- it is instituted by fixing to the basic member 37 bottom the fixed part 35 with which the lower limit section of a body 51 is equipped.

[0005] moreover, said transit shed -- a body 51 is constituted along with the lower limit section of an outer wall 34 by protruding said fixed part 35 carried out outside in the direction of a right angle while it forms the abbreviation square drill-like top-plate section 31 in \*\*\*\*\* of the \*\*\*\*\* square drill-like outer wall 34.

[0006] and the transit shed constituted with the outer wall 34 of the shape of a \*\*\*\*\* square drill equipped with said top-plate section 31 and fixed part 35 -- the body 51 consists of a before [ the pair which carried out 2 rates of the core of this to the lengthwise direction ] side, and backside division members 51A and 51B.

[0007] Namely, the division members 51A and 51B of a pair Make the flanges 32A and 32B for \*\*\*\* which protruded along with the rim of mutual \*\*\*\*\* 52A and 52B protrude, and by FRP (fiber reinforced plastics), while fabricating to one, respectively concluding the bipartite rate members 51A and 51B by the matching bundle, and concluding Flanges 32A and 32B with two or more bolts 33 by \*\*\*\*\* 52A and 52B -- a transit shed -- it enables it to constitute a body 51

[0008] Moreover, while the door 39 which can be opened and closed freely is formed in the transverse plane of before side division member 51A of the division members 51A and 51B of said pair, it is constituted by establishing a ventilating opening 40 in the top-plate section 31 of backside division member 51B.

[0009] Furthermore, the taper sections 31A, 31B, 34A, and 34B are formed in the weatherproof list from on the appearance design at the top-plate section 31 of the biparite rate members 51A and 51B, and the corner section of an outer wall 34.

[0010] now, the transit shed which consists of the above configuration -- a body 51 -- the object for severe earthquake observation facilities, in instituting as a transit shed 50 As shown in drawing 15 , while placing and building the basic member 37 in a facility location, it relates to construction of this basic member 37. The bolthole 36 drilled in the fixed part 35 of a body 51 is minded. said transit shed -- two or more bolts 38 for fixing the fixed part 35 of a body 51 -- beforehand -- a predetermined location - - laying-under-the-ground immobilization -- carrying out -- a transit shed -- with a bolt 38 fixing a fixed part 35 -- a transit shed -- the facility of a transit shed 50 can be completed, setting up a body 51 to the basic member 37 up side.

[0011]

[Problem(s) to be Solved by the Invention] now, the object for severe earthquake observation facilities which consists of said configuration -- according to a transit shed 50 -- a transit shed, while the division members 51A and 51B of pair order both sides constitute a body 51 In nothing and the facility to a necessary location, the biparite rate members 51A and 51B so that it can constitute by carrying out bolting of the flanges 32A and 32B for \*\*\*\* protruding a fixed part 35 on the division members 51A and 51B of said pair, while laying placing of the basic member 37, and the bolt 38 for immobilization relevant to this underground, and concluding this in said bolt 38 -- said object for severe earthquake observation facilities -- the facility of a transit shed 50 can be completed.

[0012] therefore, the simple configuration by the combination of the division members 51A and 51B of the pair of order both sides -- a transit shed, while being able to constitute a body 51 the transit shed concerned -- formation of a body 51 cheaply [ can mass-produce and ] by reinforced plastics, such as FRP and the transit shed which is rich also in appearance nature -- a body 51 can be offered -- in addition, the original effectiveness of the transit shed 50 about endurance, such as a water resisting property demanded in arrangement of other observation or the device for measurement, or weatherability Also when it can attain easily and institutes a transit shed 50 in a further necessary location by selection of the formation material, as mentioned above the placing activity of the basic member 37, and a transit shed -- it can complete according to the easy activity of the bolting activity of the fixed part 35 of a body 51, and the simplicity of construction and economical efficiency may also be improved.

[0013] however, the object for severe earthquake observation for facilities mentioned above -- in the transit shed 50, in spite of having had the operation effectiveness of said many, existence of the following faults became clear in actual operation on the structure.

[0014] namely, the transit shed shown in drawing 14 -- it became clear that the top-plate section 31 of a body 51 had a problem on the reinforcement that it consists of structure further and the snow load in a facility location cannot be borne by \*\*\*\*\*, by FRP.

[0015] Therefore, this invention was developed in view of said trouble, is excellent in heat retaining property, such as a heatproof and the cold-proof, at the list on the strength demanded in the top-plate section of this seed outdoor building, and aims at offer of the outdoor building which is rich in endurance at a weatherproof list.

[0016]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is characterized by constituting the top plate of the top-plate section of said outdoor building with the multilayer board which has a hard foaming layer in the outdoor building used when arranging the device for observation or the devices for measurement, such as the weather or a seismic observation, etc. in the outdoors.

[0017]

[Embodiment of the Invention]

The gestalt of operation of this invention is concretely explained with a drawing below the [gestalt 1 of operation]. the gestalt of this operation -- as an outdoor building -- the object for severe earthquake

observation facilities -- the case where this invention is applied to a transit shed is explained.

[0018] drawing 1 to drawing 13 -- the gestalt 1 of operation of this invention -- being shown -- drawing 1 -- the object for severe earthquake observation facilities -- the perspective view of a transit shed -- drawing 2 and drawing 3 -- the object for severe earthquake observation facilities -- the transit shed of a transit shed -- before constituting a body, the perspective view of a backside division member and drawing 5 the top view of a side division member and a backside division member, and drawing 4 The front view and drawing 6 which show \*\*\*\*\* of a before side and a backside division member The top view of a reinforcement member, drawing 7 -- the object for severe earthquake observation facilities -- the sectional view showing the condition of having made the reinforcement member unifying in the configuration member of a transit shed -- A sectional view when drawing 8 applies a reinforcement member to a before side and the flange of \*\*\*\*\* of a backside division member, The explanatory view showing the configuration of the reinforcement member with which drawing 9 reinforces this flange, the explanatory view showing the configuration of the reinforcement member with which drawing 10 reinforces the fixed part of a before side and a backside division member, A before side and the sectional view of the top-plate section of a backside division member, and drawing 13 of the sectional view in which drawing 11 shows the fixed condition of a basic member and a fixed part, and drawing 12 are the same section expanded sectional views.

[0019] the object for severe earthquake observation facilities which carries out a deer and which is shown in drawing 1 -- a transit shed 50 -- a transit shed -- it is instituted by fixing to the basic member 7 bottom the fixed part 5 with which the lower limit section of a body 51 is equipped.

[0020] moreover, said transit shed -- a body 51 is constituted along with the lower limit section of an outer wall 8 by protruding said fixed part 5 carried out outside in the direction of a right angle while it forms the abbreviation square drill-like top-plate section 1 in \*\*\*\*\* of the \*\*\*\*\* square drill-like outer wall 8.

[0021] and the transit shed constituted with the outer wall 4 of the shape of a \*\*\*\*\* square drill equipped with said top-plate section 1 and fixed part 5 as shown in drawing 3 -- the body 51 consists of a before [ the pair which carried out 2 rates of the core of this to the lengthwise direction ] side, and backside division members 51A and 51B.

[0022] Namely, the division members 51A and 51B of a pair Make the flanges 3A and 3B for \*\*\*\* which protruded along with the rim of mutual \*\*\*\*\* 52A and 52B protrude, and by FRP (fiber reinforced plastics), while fabricating to one, respectively concluding the biparite rate members 51A and 51B with a bolt 40, respectively to two or more boltholes 4 which punched by \*\*\*\*\* 52A and 52B between the matching bundle and the die-length direction of Flanges 3A and 3B -- a transit shed -- it enables it to constitute a body 51

[0023] Moreover, while the door 10 which can be opened and closed freely is formed in the transverse plane of before side division member 51A of the division members 51A and 51B of said pair, it is constituted by establishing a ventilating opening 15 in the top-plate section 1 of backside division member 51B.

[0024] Furthermore, the taper sections 1A, 1B, 8A, and 8B are formed in the weatherproof list from on the appearance design at the top-plate section 1 of the biparite rate members 51A and 51B, and the corner section of an outer wall 8.

[0025] now, the object for severe earthquake observation facilities shown by drawing 14 about the above configuration -- although it consists of the same configuration as the configuration of a transit shed 50, the transit shed 50 of this this invention differs in the configuration in the following points.

[0026] that is, it is shown in drawing 1, drawing 4, and drawing 5 -- as -- a transit shed -- it differs in the configuration of the fixed part 5 of the division members 51A and 51B of both sides before and after constituting a body 51.

[0027] The fixed part 5 of before [ the above ] side division member 51A, and backside division member 51B While protruding in the direction of a right angle and forming fixed part body 5a outside the lower limit section of the outer wall 8 of both the members 51A and 51B, edge 5b of the fixed part body 5a concerned After protruding so you may make it result outside periphery marginal 7a of the

basic member 7, it is constituted by forming the covered part 9 of the basic member 7 by protruding bottom marginal 5c in the direction of a right angle below this edge 5b.

[0028] Moreover, the fixed part 5 makes flange 5d have protruded also in the direction of the outer wall 8 lower-limit inside in order to measure stabilization of the installation condition to basic member 7 top, as shown in drawing 5 in addition to the configuration which arranges the bolthole 6 for conclusion with the bolt 14 of the basic member 7. therefore, the transit shed which sets up a fixed part 5 to the basic member 7 up side by operation to which the breadth by fixed part 5 and flange 5d was made to correspond with the breadth of the basic member 7 by protrusion with flange 5d to the direction of the lower limit inside of an outer wall 8 -- the stability of a body 51 may be improved.

[0029] Furthermore, as shown in drawing 4, behind the outer wall 8 of backside division member 51B, it serves with reservation of the arrangement part of a bolthole 6 established in a fixed part 5, and in it, it constitutes by forming the concave sections 8a and 8b of two articles in the vertical direction of an outer wall 8 so that it may also become reinforcement of an outer wall 8.

[0030] the object for the severe earthquake observation facilities of this invention which consists of the above configuration, in instituting a transit shed 50 After placing the basic member 7 in a necessary location, while carrying out laying-under-the-ground immobilization of the bolt 14 for bolting of a fixed part 5 in relation to this in a necessary part After \*\*\*\*(ing) the division members 51A and 51B of said pair to the basic member 7 up side, Conclude the conclusion bolt 40 to the bolthole 4 arranged along the die-length direction of both the flanges 3A and 3B with \*\* which compares the flanges 3A and 3B for \*\*\*\* of the biparite rate members 51A and 51B, and both are fixed to it. And by binding each bolt 14 of the basic member 7 tight to the bolthole 6 arranged in the annular direction of the fixed part 5 of the biparite rate members 51A and 51B fixing a fixed part 5 to the basic member 7 -- a transit shed -- while setting up a body 51 to the basic member 7 up side -- the object for severe earthquake observation facilities -- construction of a transit shed 50 can be completed.

[0031] therefore, the simple configuration by the combination of the division members 51A and 51B of the pair of order both sides -- a transit shed, while being able to constitute a body 51 the transit shed concerned -- formation of a body 51 cheaply [ can mass-produce and ] by reinforced plastics, such as FRP and the transit shed which is rich also in appearance nature -- a body 51 can be offered -- in addition, the original effectiveness of the transit shed 50 about endurance, such as a water resisting property demanded in arrangement of other observation or the device for measurement, or weatherability Also when it can attain easily and institutes a transit shed 50 in a further necessary location by selection of the formation material, as mentioned above the placing activity of the basic member 7, and a transit shed -- it can complete according to the easy activity of the bolting activity of the fixed part 5 of a body 51, and the simplicity of construction and economical efficiency may also be improved.

[0032] moreover -- according to operation of this invention mentioned above -- basic member 7 top -- a transit shed -- since the deck watertight luminaire and the weatherproof covered part 9 are formed in the fixed part 5 of the division members 51A and 51B on before and the backside when a body 51 is set up, the periphery edge of the basic member 7 and a fixed part 5 will be covered with this covered part 9.

[0033] Therefore, the operation effectiveness over the deck watertight luminaire between both and weatherability may be improved, without being influenced by the airtight and watertight condition by conclusion with each bolt 14 of the basic member 7 and a fixed part 5.

[0034] That is, the rainstorm water from the clearance between both who arise according to the conclusion condition of each bolt 14 of the basic member 7 and a fixed part 5 can be prevented within the limits of the operation effectiveness by existence of a deck watertight luminaire and the weatherproof covered part 9, without being influenced by the watertight between both, and the airtight condition.

[0035] in addition, the shape of a gestalt of said operation and a transit shed, although explanation of illustration is omitted inside the body 50 about the configuration member for arrangement about the device for severe earthquake observation by which arrangement hold is carried out a transit shed -- inside flange 5d of a body 51 -- constructing a bottom plate member (un-illustrating) in between, or the

shelf board member for arrangement of said device (un-illustrating) being constructed between the insides of an outer wall 8, or further A shelf board member required to arrange many facility devices (un-illustrating), such as a switchboard (un-illustrating) required of these devices, etc. is prepared and carried out.

[0036] In the transit shed 50 of this invention mentioned above, about the component of which especially high intensity is required The reinforcement member 11 which drilled two or more through holes 13 in band steel (SPCC) as shown in drawing 6 is manufactured. It unifies by laying this reinforcement member 11 underground in the thickness of the FRP section 12, as shown in drawing 7 , and making the FRP section 12 on the rear face of front of the reinforcement member 11 connect through a through hole 13, and, thereby, makes it possible to fix the reinforcement member 11 firmly in the thickness of the FRP section 12.

[0037] In this case, the thickness of the FRP section 12 in the front rear face of the reinforcement member 11 thickens one side, and he maintains the reinforcement of FRP section 12 self, and is trying for the side else to maintain the minimum thickness required to unify the reinforcement member 11 in the FRP section 12.

[0038] Moreover, as by making it larger than the path of the through tube 16 by which opening is carried out to the FRP section 12 shows the through hole 13 drilled in the reinforcement member 11 to drawing 7 , the joining segment of the FRP section 12 can remain in the bore of a through hole 13. The condition that the FRP section 12 on the rear face of front of the reinforcement member 11 was connected also in the part of a through tube 16 by this can be maintained.

[0039] As an example of reinforcement by the reinforcement member 11, drawing 8 shows the sectional view at the time of applying to the flanges 3A and 3B for \*\*\*\*. The thickness of the flanges 3A and 3B in this case is 8mm, thickness of the reinforcement member 11 was set to 1.6mm, and the thickness of the FRP section 12 in the front rear face of the reinforcement member 11 made the mating-face 3a side thinner than that tooth-back side 3b, and the through tube 16 has left the connection section of the FRP section 12 to the perimeter of a through tube 16 prepared in the center of the through hole 13 of the reinforcement member 11. When Flanges 3A and 3B are concluded by \*\*, it makes it possible to bind the flange 3 whole tight by the average force.

[0040] Drawing 9 shows the configuration of the reinforcement member 11 used for both the top-plate section [ of a flange 3 ] 1, and outer wall 8 side, has arranged the through hole 13 in 100mm pitch, and has formed the through tube 16 for every through hole 13, this heart (un-illustrating), and 300mm pitch while it forms the configuration in the configuration corresponding to Flanges 3A and 3B.

[0041] Drawing 10 shows the configuration of the reinforcement member 11 of being the case where it reinforces with the reinforcement member 11, and using the fixed part 5 to a basic member each side of a fixed part 5. Formation of the reinforcement member 11 and arrangement of a through hole 13 are the same as that of the case of Flanges 3A and 3B.

[0042] Drawing 11 shows the condition of having bound tight the fixed part 5 reinforced with the reinforcement member 11 with the foundation bolt 14 to the basic member 7, applies a side with the thin thickness of the FRP section 12 to the field of the basic member 7 to the field of the reinforcement member 11, and is fixing it with the foundation bolt 14. It makes it possible to press the fixed part 5 whole against the field of the basic member 7 by the average force by having made the reinforcement member 11 build in in one also in this case.

[0043] In addition, the reinforcement member 11 in the gestalt of this operation may use the wood which has not only band steel but other necessary reinforcement. Moreover, in addition to FlangeA [ 3 ] and 3B and fixed part 5, the reinforcement member 11 can be applied to the door attachment section, the closedown section, etc. in an entrance 10, and can strengthen the part.

[0044] Drawing 12 is the sectional view of the top-plate section 1, and it shows the condition of having formed the inner layer by the foam layer 16 which consists of rigid foam polyurethane while it forms the top plate of the top-plate section 1 in a multilayer. Moreover, drawing 13 is drawing which expanded the boundary part of an outer wall 8 and the top-plate section 1, and as shown in this drawing, it is setting the side front t1 to the 3.5 samemm as the thickness of an outer wall 8, and the 1.5 minimummm

required to wrap in the foam layer 16 for the thickness  $t_2$  on a background about the thickness of the FRP section [ in / for thickness  $T$  of the foam layer 16 / the front rear face of 15mm and the foam layer 16 ] 12.

[0045] While the top-plate section 1 can fully bear to a snow load by having unified the foam layer 16 which consists of this rigid foam polyurethane in the thickness of the top-plate section 1, it becomes possible to intercept outside air temperature according to a heat insulation operation of rigid foam polyurethane.

[0046] In addition, the hard foam layer 16 used with the gestalt of this operation may use not only rigid foam polyurethane but foam polystyrene etc.

[0047]

[Effect of the Invention] In the outdoor building used when arranging the device for observation or the devices for measurement, such as the weather or a seismic observation, etc. in the outdoors, by forming the multilayer board which has a hard foaming layer for the top plate of the top-plate section of said outdoor building, it excels in a heatproof and cold resistance at the list on the strength demanded in this seed outdoor building, and, according to this invention, the outdoor building which is rich in endurance at heat-retaining-property lists, such as weatherability, can be offered.

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[Translation done.]



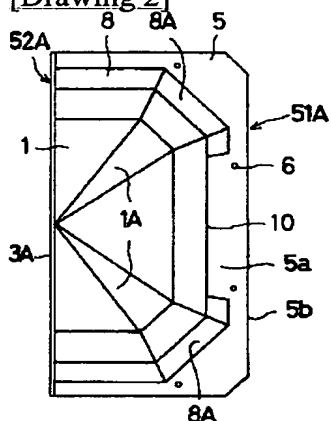
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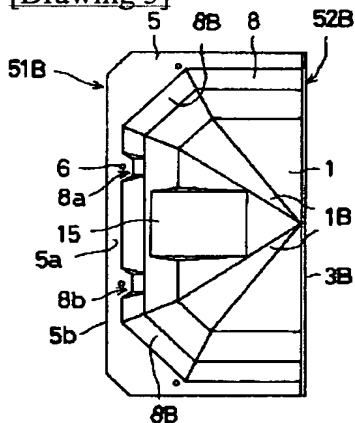
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**DRAWINGS**

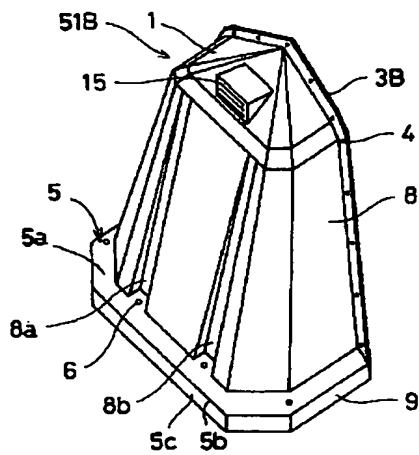
[Drawing 2]



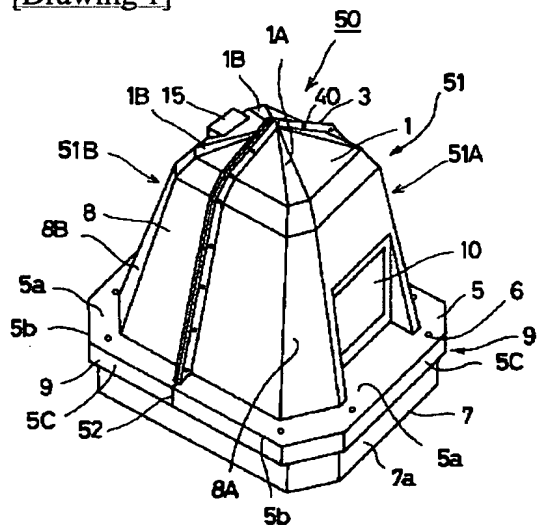
[Drawing 3]



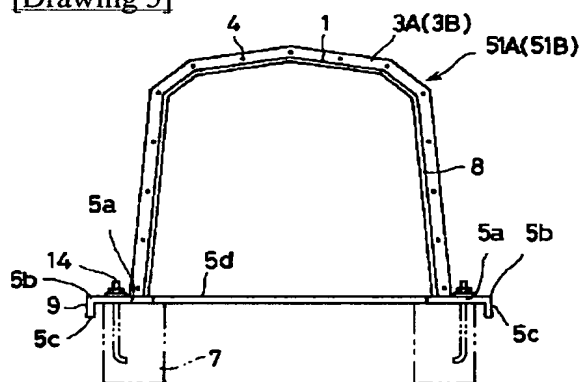
[Drawing 4]



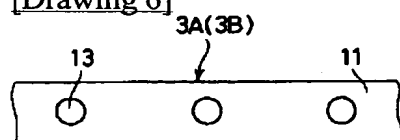
[Drawing 1]



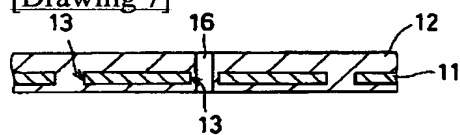
[Drawing 5]



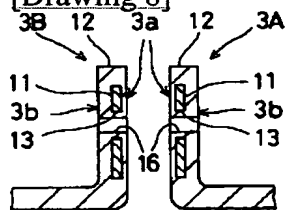
[Drawing 6]



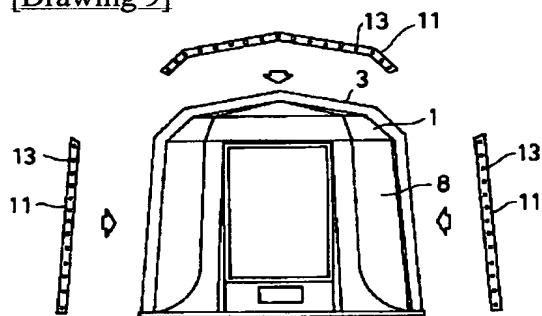
[Drawing 7]



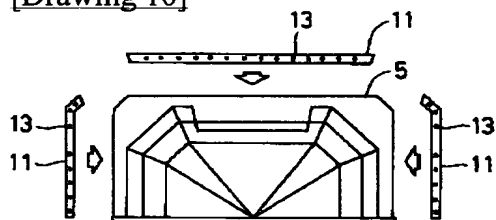
[Drawing 8]



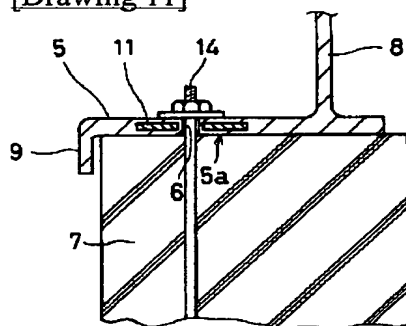
[Drawing 9]



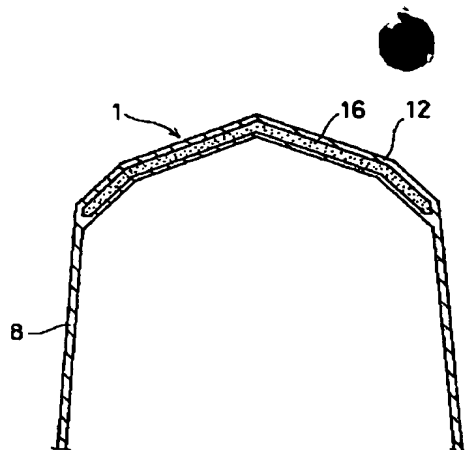
[Drawing 10]



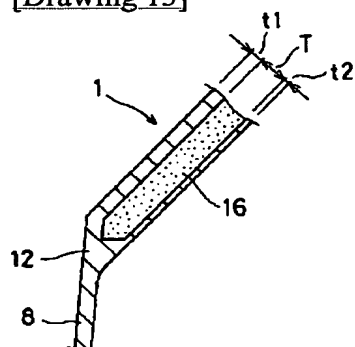
[Drawing 11]



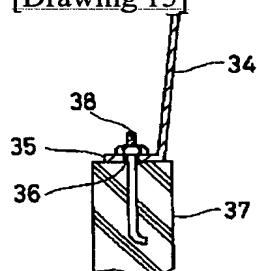
[Drawing 12]



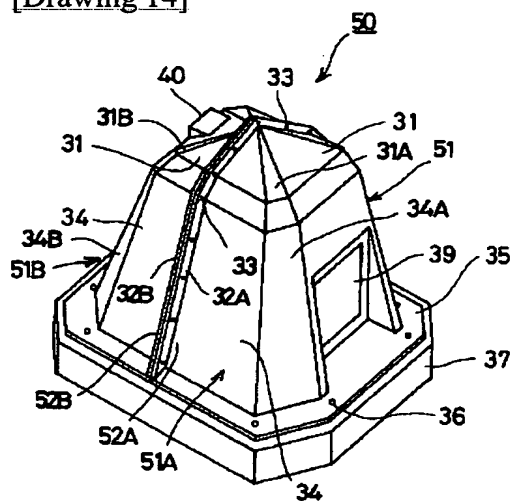
[Drawing 13]



[Drawing 15]



[Drawing 14]



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[Translation done.]

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E 0 4 B 1/343		0230-2E	E 0 4 B 1/343	K

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(71) 出願人 596000866

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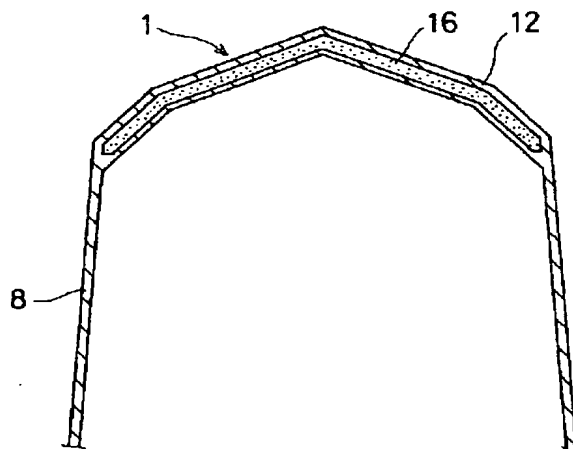
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(54) 【発明の名称】 屋外建造物

(57) 【要約】

【課題】 屋外建造物の天板部を積雪荷重に耐え得る強度、かつ断熱効果が得られるようにする。

【構成】 天板部1を形成するFRP部12の肉厚内に硬質ウレタンフォームの発泡材層16を内層させた多層構造とする。



## 【特許請求の範囲】

【請求項1】 気象あるいは地震観測等の観測用機器または計測用機器等を屋外に配設する場合に使用する屋外建造物において、前記屋外建造物の天板部の天板を硬質発泡層を有する多層板により構成したことを特徴とする屋外建造物。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、気象あるいは地震観測等の観測用機器または計測用機器、その他の各種機器並びにその設備機材等を屋外に配設する場合に使用する屋外建造物に関し、特に屋外建造物の天板部の構造に関するものである。

【0002】

【従来の技術】従来、気象あるいは地震観測等の観測用機器または計測用機器等を、その所期の観測、計測場所に配設する場合には、観測または計測用機器の本来の機能を損なわれることがないように耐水、耐火、耐候性等を備える施設用上屋を構築し、かかる施設用上屋内に、前記機器を配設収容するのが一般的である。

【0003】因って、発明者は、前記機器等の施設用上屋として、適切な所期作用効果を発揮し得る耐久性に富むとともに構築の簡易性、経済性並びに外観性に富むところの施設用上屋の開発に研究を重ね、図14に示すところの強震観測施設用上屋の実施に成功したところである。

【0004】しかして、同図示の強震観測施設用上屋50は、上屋本体51の下端部に備える固定部35を基礎部材37上側に固定することにより施設される。

【0005】また、前記上屋本体51は略頭截四角錐状の外壁34の頭截部に略四角錐状の天板部31を設けるとともに外壁34の下端部に沿って、前記した固定部35を外側に、直角方向に突設することにより構成されている。

【0006】しかも、前記天板部31および固定部35を備える略頭截四角錐状の外壁34により構成される上屋本体51は、これの中心を縦方向に2つ割した一対の前側および後側分割部材51A、51Bから構成されている。

【0007】すなわち、一対の分割部材51A、51Bは、互いの突合部52A、52Bの外縁に沿って突設した突合用のフランジ32A、32Bを突設せしめて、FRP（繊維強化プラスチック）により、それぞれ一体に成形するとともに、両分割部材51A、51Bを突合部52A、52Bにて突合せしめ、フランジ32A、32Bを複数のボルト33によって締結することにより、上屋本体51を構成し得るようにしたものである。

【0008】また、前記一対の分割部材51A、51Bのうちの前側分割部材51Aの正面には、開閉自在なドア39が設けられるとともに後側分割部材51Bの天板

部31には換気口40を設けることにより構成されている。

【0009】さらに、両分割部材51A、51Bの天板部31と外壁34のコーナー部には耐候性並びに外観デザイン上からテーパー部31A、31B、34A、34Bを設けてある。

【0010】さて、以上の構成から成る上屋本体51を強震観測施設用上屋50として施設する場合には、図15に示す如く、施設場所に基礎部材37を打設して構築するとともにかかる基礎部材37の構築に関連して、前記上屋本体51の固定部35を固定するための複数のボルト38を予め所定位置に埋設固定しておき、上屋本体51の固定部35に穿設したボルト穴36を介してボルト38により、固定部35を固定することにより、上屋本体51を基礎部材37上側に立設しつつ上屋50の施設を完了することができる。

【0011】

【発明が解決しようとする課題】さて、前記構成から成る強震観測施設用上屋50によれば、上屋本体51を一対の前後両側の分割部材51A、51Bにより構成するとともに、両分割部材51A、51Bを突合用フランジ32A、32Bをボルト締めすることにより構成し得るようになり、また、所要位置への施設に当たっては、基礎部材37の打設とこれに関連した固定用のボルト38の埋設を行うとともに前記一対の分割部材51A、51Bには固定部35を突設し、これを前記ボルト38に締結することにより、前記強震観測施設用上屋50の施設を完了することができるものである。

【0012】従って、前後両側の一対の分割部材51A、51Bの組み合わせによる簡易な構成にて上屋本体51を構成できるとともに、当該上屋本体51の形成はFRP等の強化プラスチックによって量産が可能で安価に、しかも外観性にも富む上屋本体51を提供できるとに加えて、その他の観測または計測用機器等の配設に当たって要求される耐水性あるいは耐候性等の耐久性についての上屋50の本来の効果も、その形成素材の選択によって簡単に達成することができ、さらに、所要の場所に上屋50を施設する場合にも、前述したように、基礎部材37の打設作業と上屋本体51の固定部35のボルト締め作業という簡単な作業により完了でき、構築の簡易性、経済性をも向上し得るものである。

【0013】しかるに、前述してきた、強震観測用施設用上屋50においては、前記多くの作用効果を有するに拘らず、その構造上、以下の欠点の存在が実際の実施に当たって判明したのである。

【0014】すなわち、図14に示される上屋本体51の天板部31はFRPにより、一層構造から成ることにより、施設場所における積雪荷重に耐えられないという強度上の問題があることが判明した。

【0015】因って、本発明は、前記問題点を鑑みて開

発されたもので、この種屋外建造物の天板部において要求される強度並びに耐熱、耐冷等の保温性に優れ、耐候性並びに耐久性に富む屋外建造物の提供を目的とする。

【0016】

【課題を解決するための手段】上記目的を達成するため、本発明は、気象あるいは地震観測等の観測用機器または計測用機器等を屋外に配設する場合に使用する屋外建造物において、前記屋外建造物の天板部の天板を硬質発泡層を有する多層板により構成したことを特徴とする。

【0017】

【発明の実施の形態】

【実施の形態1】以下、本発明の実施の形態を図面とともに具体的に説明する。本実施の形態では屋外建造物として強震観測施設用上屋に本発明を適用した場合について説明する。

【0018】図1から図13は本発明の実施の形態1を示し、図1は強震観測施設用上屋の斜視図、図2及び図3は強震観測施設用上屋の上屋本体を構成する前側分割部材と後側分割部材の平面図、図4は後側分割部材の斜視図、図5は、前側および後側分割部材の突合部を示す正面図、図6は補強部材の平面図、図7は強震観測施設用上屋の構成部材内に補強部材を一体化させた状態を示す断面図、図8は前側および後側分割部材の突合部のフランジに補強部材を適用した場合の断面図、図9は同フランジを補強する補強部材の構成を示す説明図、図10は前側および後側分割部材の固定部を補強する補強部材の構成を示す説明図、図11は基礎部材と固定部との固定状態を示す断面図、図12は前側および後側分割部材の天板部の断面図、図13は同一部拡大断面図である。

【0019】しかして、図1に示す強震観測施設用上屋50は、上屋本体51の下端部に備える固定部5を基礎部材7上側に固定することにより施設される。

【0020】また、前記上屋本体51は略頭截四角錐状の外壁8の頭截部に略四角錐状の天板部1を設けるとともに外壁8の下端部に沿って、前記した固定部5を外側に、直角方向に突設することにより構成されている。

【0021】しかも、図3に示す如く前記天板部1および固定部5を備える略頭截四角錐状の外壁4により構成される上屋本体51は、これの中心を縦方向に2つ割した一对の前側および後側分割部材51A、51Bから構成されている。

【0022】すなわち、一对の分割部材51A、51Bは、互いの突合部52A、52Bの外縁に沿って突設した突合用のフランジ3A、3Bを突設せしめて、FRP（繊維強化プラスチック）により、それぞれ一体に成形するとともに、両分割部材51A、51Bを突合部52A、52Bにて突合せしめ、フランジ3A、3Bの長さ方向間に穿孔した複数のボルト穴4に、それぞれボルト40によって締結することにより、上屋本体51を構成

し得るようにしたものである。

【0023】また、前記一对の分割部材51A、51Bのうちの前側分割部材51Aの正面には、開閉自在なドア10が設けられるとともに後側分割部材51Bの天板部1には換気口15を設けることにより構成されている。

【0024】さらに、両分割部材51A、51Bの天板部1と外壁8のコーナー部には耐候性並びに外観デザイン上からテーパー部1A、1B、8A、8Bを設けてある。

【0025】さて、以上の構成については、図14にて示される強震観測施設用上屋50の構成と同一の構成から成るが、かかる本発明の上屋50は、以下の点において、その構成を異にするものである。

【0026】すなわち、図1、図4および図5に示す如く、上屋本体51を構成する前後両側の分割部材51A、51Bの固定部5の構成を異にするものである。

【0027】前記の前側分割部材51Aおよび後側分割部材51Bの固定部5は、両部材51Aおよび51Bの外壁8の下端部より外側に固定部本体5aを直角方向に突設して形成するとともに当該固定部本体5aの端部5bを、基礎部材7の外周縁7aより外側に至らしめるべく突設した後、かかる端部5bより下側に直角方向に下側縁5cを突設することにより、基礎部材7の覆部9を設けることにより構成されている。

【0028】また、固定部5は、基礎部材7のボルト14との締結用ボルト穴6を配設する構成に加えて図5に示す如く、基礎部材7上側への載置状態の安定化を計るため、外壁8下端内側方向にもフランジ5dを突設せしめてある。従って、固定部5は外壁8の下端内側方向へのフランジ5dとの突設により固定部5およびフランジ5dによる横幅を基礎部材7の横幅と対応せしめた実施により、基礎部材7上側に立設する上屋本体51の安定性を向上し得るものである。

【0029】さらに、図4に示す如く、後側分割部材51Bの外壁8の背部には、固定部5に設けるボルト穴6の配設箇所の確保と兼ねて、外壁8の補強にもなるように、外壁8の上下方向に2条の凹溝部8a、8bを設けることにより構成してある。

【0030】以上の構成から成る本発明の強震観測施設用上屋50を施設する場合には、所要場所に基礎部材7を打設した後、これに関連して、固定部5の締め付け用のボルト14を所要箇所に埋設固定する一方、前記一对の分割部材51A、51Bを基礎部材7上側に乗載した後、両分割部材51A、51Bの突合用フランジ3A、3Bを突合するとともに両フランジ3A、3Bの長さ方向に沿って配設したボルト穴4に締結ボルト40を締結して両者を固定し、かつ両分割部材51A、51Bの固定部5の環状方向に配設されたボルト穴6に基礎部材7の各ボルト14を締め付けることにより、固定部5を基



基礎部材7に固定することにより、上屋本体51を基礎部材7上側に立設しつつ、強震観測施設用上屋50の構築を完了することができる。

【0031】従って、前後両側の一对の分割部材51A、51Bの組み合わせによる簡易な構成にて上屋本体51を構成できるとともに、当該上屋本体51の形成はFRP等の強化プラスチックによって量産が可能で安価に、しかも外観性にも富む上屋本体51を提供できることに加えて、その他の観測または計測用機器等の配設に当たって要求される耐水性あるいは耐候性等の耐久性についての上屋50の本来の効果も、その形成素材の選択によって簡単に達成することができ、さらに、所要の場所に上屋50を施設する場合にも、前述したように、基礎部材7の打設作業と上屋本体51の固定部5のボルト締め作業という簡単な作業により完了でき、構築の簡易性、経済性をも向上し得るものである。

【0032】また、前述してきた本発明の実施によれば基礎部材7上側に上屋本体51を立設した場合、前側および後側の分割部材51A、51Bの固定部5には耐水、耐候性覆部9が設けられているため、基礎部材7と固定部5の外周縁がこの覆部9によって被覆されることになる。

【0033】従って、基礎部材7と固定部5の各ボルト14による締結による気密および水密状態に左右されることなく、両者間の耐水、耐候性に対する作用効果を向上し得る。

【0034】すなわち、基礎部材7と固定部5の各ボルト14の締結状態によって生ずる両者間の隙間からの風雨水を両者間の水密、気密状態に左右されずに耐水、耐候性覆部9の存在による作用効果の範囲内において防止することができる。

【0035】尚、前記実施の形態状、上屋本体50の内部に配設収容される強震観測用機器についての配設用構成部材については、図示の説明を省いているが、上屋本体51の内側フランジ5d間に底板部材（不図示）を架設したり、あるいは外壁8の内側間に前記機器の配設用棚板部材（不図示）を架設したり、さらには、これらの機器に要求される配電盤（不図示）等の諸設備機器（不図示）を配設するに必要な棚板部材等を設けて実施するものである。

【0036】前述してきた本発明の上屋50において、特に高強度を要求される構成部分については、図6に示すような帯鋼（SPCC）に複数の貫通穴13を穿設した補強部材11を製作し、この補強部材11を図7に示すようにFRP部12の肉厚内に埋設して補強部材11の表裏面のFRP部12を貫通穴13を介して連結させることにより一体化し、これにより、補強部材11をFRP部12の肉厚内に強固に固定することを可能にしている。

【0037】この場合、補強部材11の表裏面における

FRP部12の厚さは、一方の側を厚くしてFRP部12自身の強度を保たせ、他の側は補強部材11をFRP部12内に一体化するに必要な最小限の厚さを保たせるようにしている。

【0038】また、補強部材11に穿設する貫通穴13はFRP部12に開口される貫通穴16の径より大きくしておくことにより、図7に示すように貫通穴13の内径にFRP部12の連結部分が残るようにすることができる。これにより貫通穴16の部分においても補強部材11の表裏面のFRP部12が連結された状態を保たせることができる。

【0039】図8は補強部材11による補強例として、突合用フランジ3A、3Bに適用した場合の断面図を示す。この場合のフランジ3A、3Bの肉厚は8mmで、補強部材11の厚さを1.6mmとし、補強部材11の表裏面におけるFRP部12の厚さは合わせ面3a側をその背面側3bより薄くし、また貫通穴16は補強部材11の貫通穴13の中央に設けた貫通穴16の周囲にFRP部12の連結部を残している。これによりフランジ3A、3Bを締結した際にフランジ3全体を平均的な力で締めつけることを可能にしている。

【0040】図9はフランジ3の天板部1側及び両外壁8側に用いる補強部材11の形状を示しており、その形状はフランジ3A、3Bに対応した形状に形成するとともに、貫通穴13を100mmピッチに配置し、貫通穴16を貫通穴13と同芯（不図示）かつ300mmピッチ毎に設けている。

【0041】図10は基礎部材に対する固定部5を補強部材11にて補強する場合であり、固定部5の各辺に用いる補強部材11の形状を示している。補強部材11の形成及び貫通穴13の配置はフランジ3A、3Bの場合と同様である。

【0042】図11は補強部材11にて補強された固定部5を基礎部材7に対して基礎ボルト14にて締め付けた状態を示しており、補強部材11の面に対してFRP部12の厚さが薄い側を基礎部材7の面に当てて基礎ボルト14にて固定している。この場合も補強部材11を一体的に内蔵させたことにより固定部5全体を平均的な力で基礎部材7の面に押し当てることを可能にしている。

【0043】なお、本実施の形態における補強部材11は帯鋼に限らず他の所要の強度を有する木材等を用いてもよい。また、補強部材11はフランジ3A、3B及び固定部5以外に、出入り口10におけるドア取付部や閉止部等にも適用してその部分を強化することができる。

【0044】図12は天板部1の断面図であり、天板部1の天板を多層に形成するとともにその内層を硬質フォームポリウレタンからなる発泡材層16により形成した状態を示している。また図13は外壁8と天板部1との境界部分を拡大した図であり、この図に示すように発泡

材層16の厚さTを15mm、発泡材層16の表裏面におけるFRP部12の厚さについては表側t1を外壁8の厚さと同様な3.5mm、裏側の厚さt2を発泡材層16を包み込むに必要な最小限の1.5mmとしている。

【0045】この硬質フォームポリウレタンからなる発泡材層16を天板部1の肉厚内に一体化したことにより天板部1が積雪荷重に対して充分に耐えることができるとともに、硬質フォームポリウレタンの断熱作用により外気温を遮断することが可能になる。

【0046】なお、本実施の形態で用いた硬質発泡材層16は硬質フォームポリウレタンに限らずフォームポリスチレン等を用いてもよい。

【0047】

【発明の効果】本発明によれば、気象あるいは地震観測等の観測用機器または計測用機器等を屋外に配設する場合に使用する屋外建造物において、前記屋外建造物の天板部の天板を硬質発泡層を有する多層板を設けることにより、この種屋外建造物において要求される強度並びに耐熱、耐冷性に優れ、耐候等の保温性並びに耐久性に富む屋外建造物を提供することができる。

【図面の簡単な説明】

【図1】本発明を適用した強震観測施設用上屋の斜視図。

【図2】強震観測施設用上屋の上屋本体を構成する前側分割部材と後側分割部材の平面図。

【図3】強震観測施設用上屋の上屋本体を構成する前側分割部材と後側分割部材の平面図。

【図4】後側分割部材の斜視図。

【図5】前側および後側分割部材の突合部を示す正面図。

【図6】補強部材の平面図。

【図7】強震観測施設用上屋の構成部材内部に補強部材\*

\*を一体化させた状態を示す断面。

【図8】固定部に補強部材を適用した場合の断面図。

【図9】突合用フランジを補強する補強部材の構成を示す説明図。

【図10】固定部を補強する補強部材の構成を示す説明図。

【図11】固定部と基礎部材との固定状態を示す断面図。

【図12】強震観測施設用上屋の天板部の断面図。

10 【図13】天板部の一部拡大断面図。

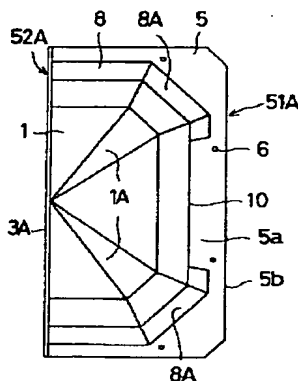
【図14】従来の屋外建造物の説明図。

【図15】従来の屋外建造物の固定部を示す断面図。

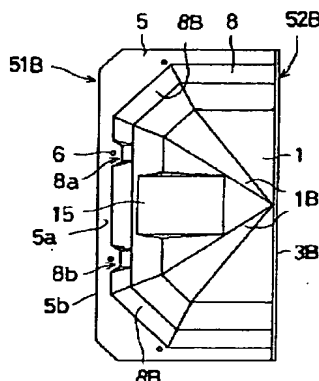
【符号の説明】

- 1 天板部
- 2 突合部
- 3 突合用フランジ
- 4、6 ボルト穴
- 5 固定部
- 5a 固定部本体
- 5b 固定部本体の端部
- 5c 下側縁
- 7 基礎部材
- 8 外壁
- 9 耐水、耐候性覆部
- 10 出入口
- 11 補強部材
- 12 FRP部
- 13 貫通穴
- 14、40 ボルト
- 15 換気口
- 16 発泡材層
- 50 上屋
- 51 上屋本体

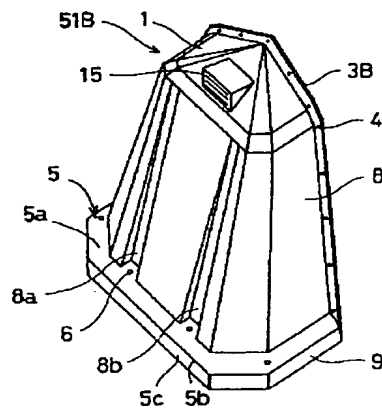
【図2】



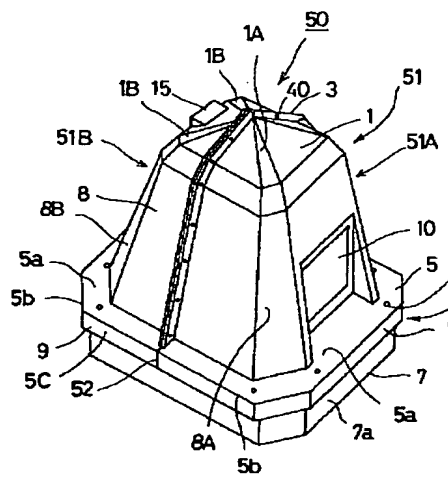
【図3】



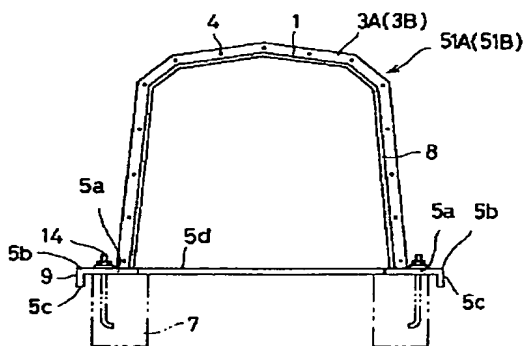
【図4】



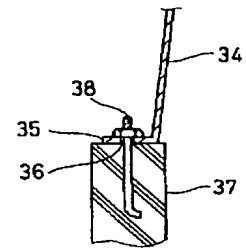
【図1】



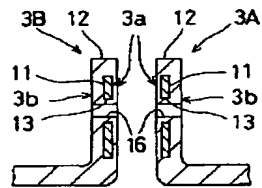
【図5】



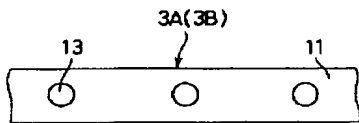
【図15】



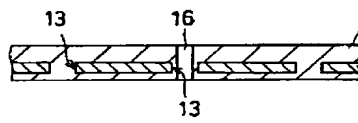
【図8】



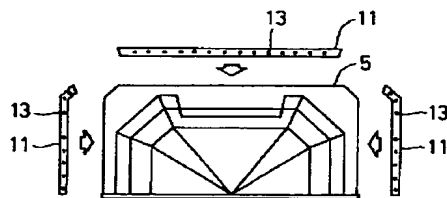
【図6】



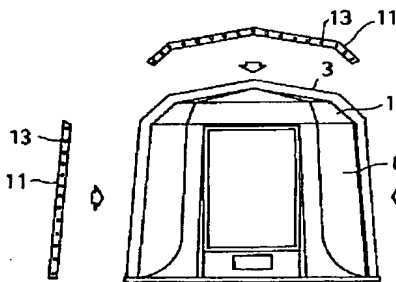
【図7】



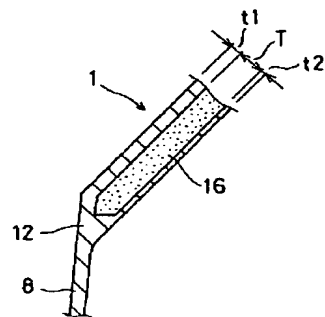
【図10】



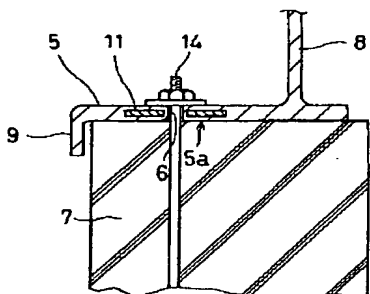
【図9】



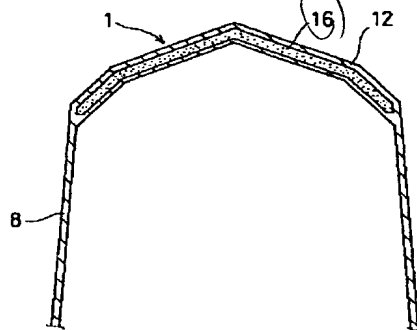
【図13】



【図11】



【図12】



【図14】

